

Remarks

The examiner's reconsideration of the application is requested in view of the amendments above, attachments hereto and comments which follow.

Turning first to numbered section three of the office action, a revised abstract is appended hereto. The abstract is in proper form, and approval is requested.

In numbered section 4, the examiner objected to claim 14 because of a spelling error. That error has been corrected above.

Regarding section 5, claim 15 has been amended to change the word "an" to "a". That, it is believed, takes care of the problem noted.

In numbered section 7, the examiner rejected claim 14 as being indefinite because of the "prismatic unit" in line 4. That has been changed to "the light splitting unit". Everything should therefore be in order.

Claims 1 to 5, 7 to 9, 11, 13 to 18 and 20 are rejected under 35 U.S.C. 102 (e) as being anticipated by Fujimori in US-6,350,033.

Claims 6, 10, 12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US-6,350,033, and further in view of US-6,416,183.

First, US – 6,416,183 is not an appropriate reference because for the present invention priority is claimed to September 20, 2000. This date is in advance of the filing date of US-6,416,183, which is December 4, 2000. Column 5, line 38 to 43 incorporates by reference EP 00 20 32 60.5 which is the equivalent of the present patent application which indicates that the subject matter of '183 has a later filing and invention date than that of the present application. Further comments are thus in relation to US – 6,350,033.

Claim 1

Claims 1 to 5, 7 to 9, 11, 13 to 18 and 20 are rejected under 35 U.S.C. 102 (e) as being anticipated by Fujimori in US – 6,350,033. Reconsideration is requested.

Claim 1 relates to a spatial light modulating unit provided with a light splitting unit for separating white light into a plurality of light color components and a plurality of reflective spatial light modulators for modulating the light color components. The spatial light modulating unit is enclosed by a substantially sealed chamber having walls and comprises a cooling system for cooling each reflective spatial light modulator, the cooling system providing a heat path connection through a wall of the sealed chamber for cooling each reflective spatial light modulator, the cooling system being heat conductively connected to each reflective spatial light modulator.

The cooling system of US – 6,350,033 differs from the cooling structure of the present invention in that, according to the present invention, a heat path connection through a wall of the sealed chamber is provided for cooling each spatial light modulator. In particular a **heat conductive connection** (rather than a convective connection) between the cooling system and each reflective spatial light modulator is provided.

A heat conductive connection is not described in US – 6,350,033, where a clearance is formed between a wall of the enclosure and the liquid crystal displays. The clearance must have certain dimensions, so as to allow air inside the enclosing structure to be suitably circulated along the clearance and in order to efficiently cool the electro-optical apparatus (Col.17 l.23-45 and Fig. 6). In particular this dimension is set at 1mm minimum (see Col. 17 l. 41).

US – 6,350,033 does describe radiating fins for releasing heat inside the air circulation path (Col.3 l.16-25). Therefore, it does describe a cooling system providing a heat path connection through a wall of the sealed chamber. Furthermore, the ultimate goal of this cooling is cooling of the modulating devices (by cooling the air in the air circulation path, and then sending this cooled air over the spatial light modulators). The cooling system described is, however, not **heat conductively** connected to each spatial light modulator. A straightening plate is provided for dividing air ejected from the air circulation path so that the air cooled in the air circulation path can be guided along the spatial light modulators (Col. 4 l.63-Col.5 l.6). This, however, does not provide a **heat conductive** connection between the cooling system and the reflective spatial light modulators but rather is **heat convectively** connected through an air gap.

This heat conductive connection between cooling system and reflective spatial light modulator feature of claim 1 is not disclosed in US-6,350,033 nor is there any hint thereof. Providing a heat conductive connection through the wall of the enclosure requires inventive activity as it requires some form of solid connection which is continuous through the wall and requires a different design of the device. This requirement for through-the-wall conduction has now been specified more closely in the claim. Amended claim 1 is therefore considered to be allowable over this reference.

Claims 2-14

Claims 2 to 14 are dependent on claim 1, and as claim 1 is considered to be patentable, its dependent claims are deemed patentable as well.

Claim 15

Claim 15 relates to a projector apparatus having a spatial light modulating unit according to claim 1.

As claim 1 is considered allowable over the cited prior art (see discussion above), claim 15 is allowable as well.

Claim 16

Claim 16 relates to a method of cooling a projector apparatus having a spatial light

modulating unit provided with a plurality of reflective spatial light modulators, and a light splitting unit for splitting white light into component colors, the spatial light modulating unit being enclosed by a substantially sealed chamber having walls. The method comprises the step of cooling each reflective spatial light modulator via a heat path connection through a wall of the sealed chamber, the heat path connection being heat conductively connected to each reflective spatial light modulator.

As described above with respect to claim 1, US-6,350,033 does not describe, nor hint at, spatial light modulators being heat conductively connected to a heat path connection through the wall of the sealed chamber.

Claim 16 has been amended to be consistent with new claim 1

Claim 16 is therefore allowable over this reference.

Claims 17 - 20

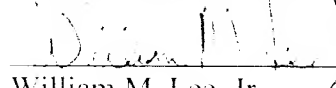
Claims 17 to 20 are dependent on claim 16, and as claim 16 is considered to be patentable, its dependent claims are deemed patentable as well.

Given the above, it is submitted that this application is now in condition for allowance,
and the examiner's further and favorable reconsideration of the application is urged.

This response is timely, in that May 4, 2003 was a Sunday.

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Respectfully submitted,



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Abstract

Projector with sealed inner compartment

A projector apparatus is provided which can handle high light intensities without dust or foreign matter penetrating to the inside of the apparatus and thus deteriorating the quality of the image projected. The projector apparatus comprises a spatial light modulator (SLM) unit provided with a plurality of reflective SLMs and a prismatic light splitting/combining unit. The SLM unit is enclosed in a substantially sealed chamber. A heat path for cooling each SLM is provided, whereby the heat path connection is through the wall of the substantially sealed chamber. In this way, heat energy from the main heat source inside the sealed chamber is brought outside the sealed chamber for dissipation.